

Figure 1

Figure 2A

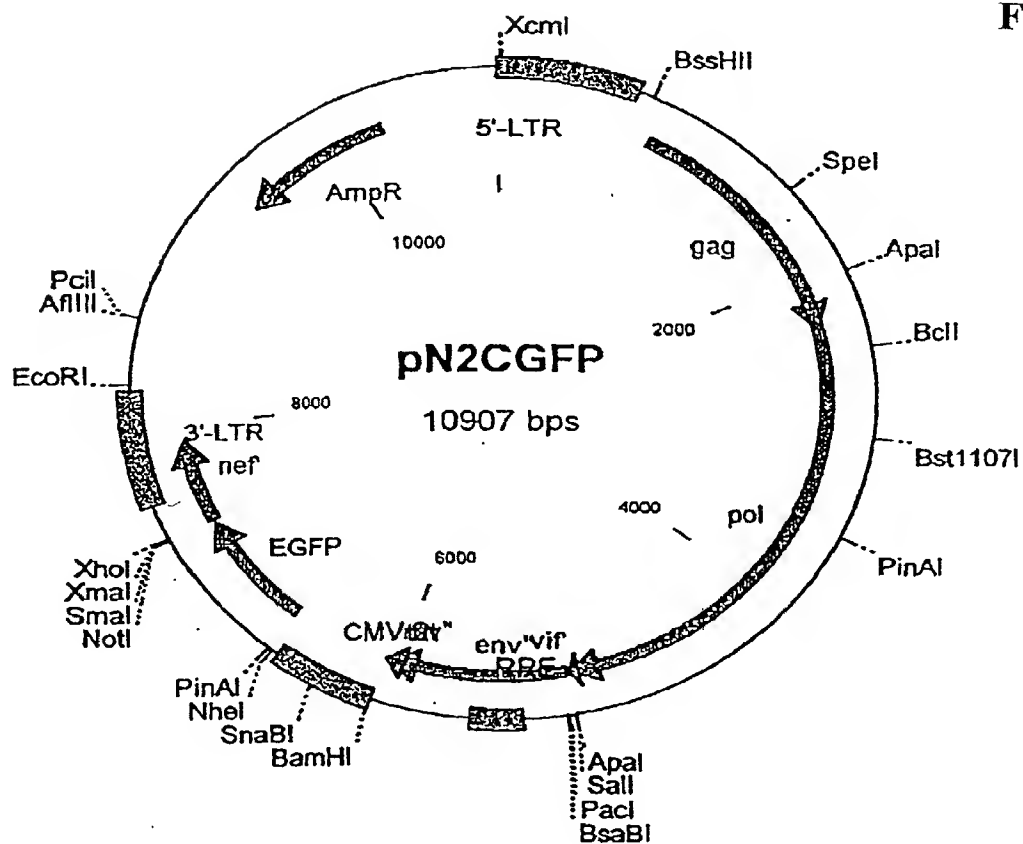


Figure 2B

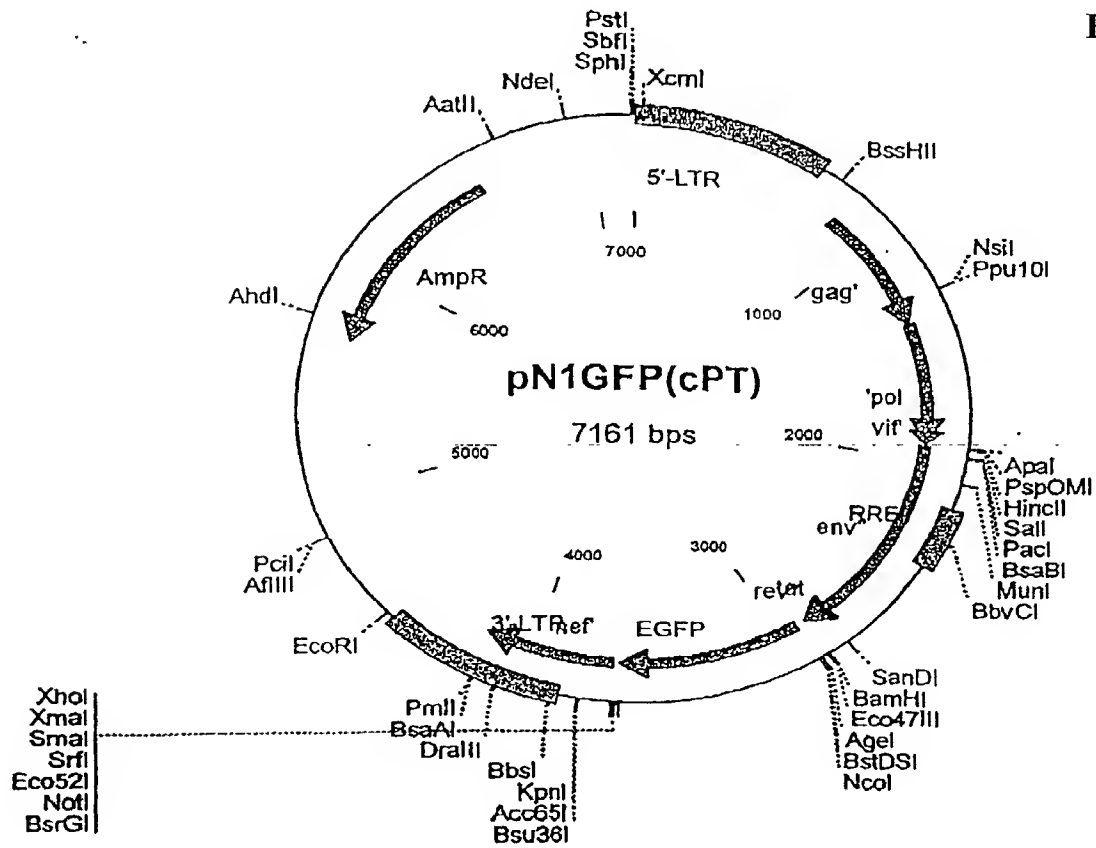


Figure 3

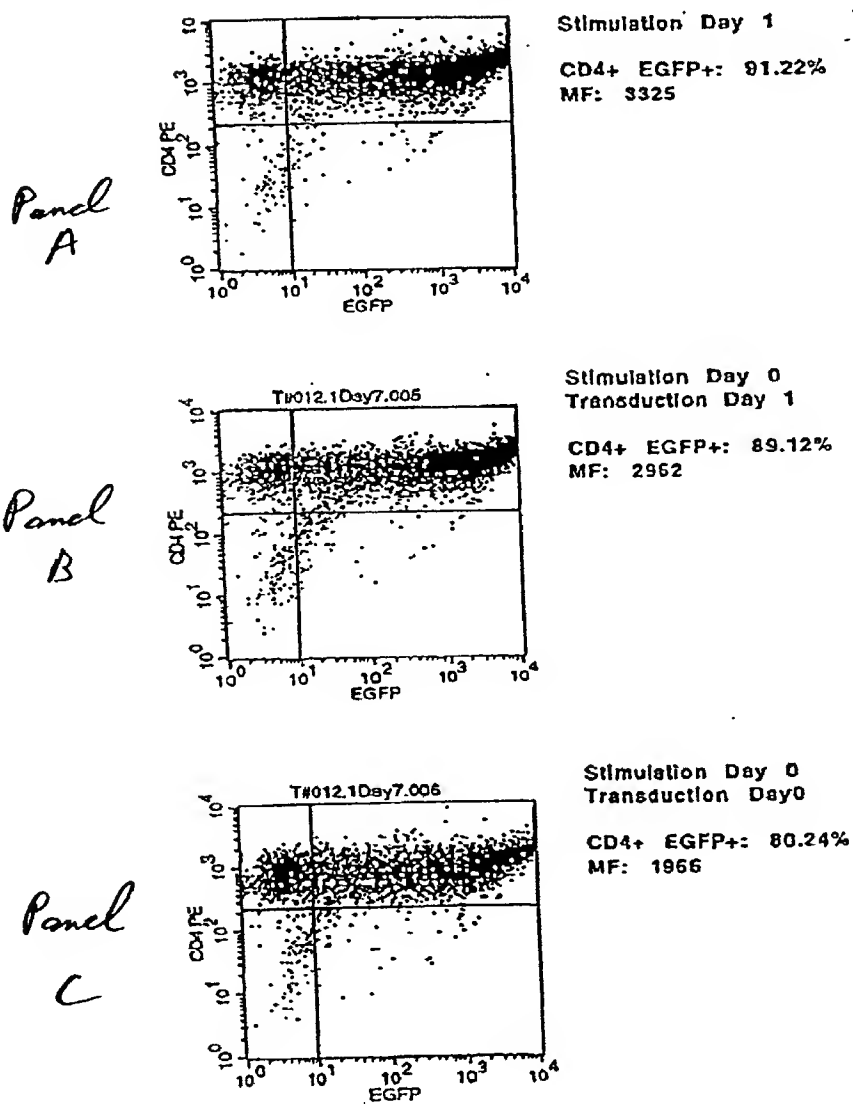
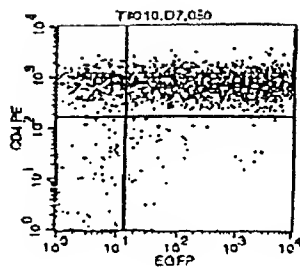
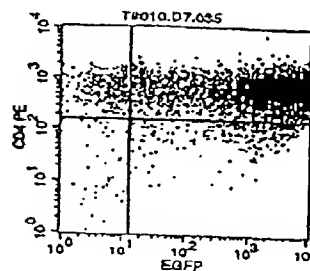


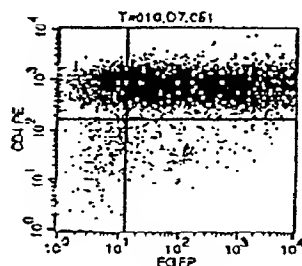
Figure 4



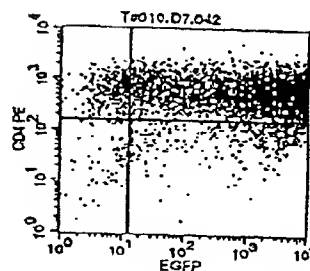
IL2/PHA-p
CD4+ EGFP+: 84.5%
MF: 1920



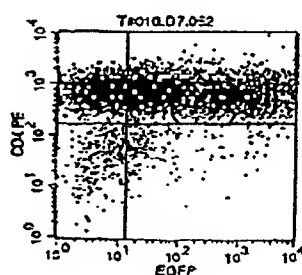
ICD3/iCD28
CD4+ EGFP+: 96%
MF: 5450



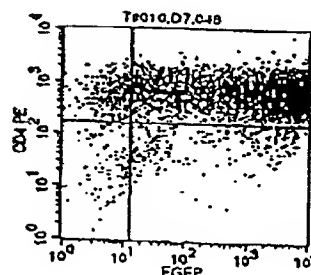
IL2/PHA-P
CD4+ EGFP+: 80.95%
MF: 1110



ICD3/iCD28
CD4+ EGFP+: 95.5%
MF: 5259



IL2/PHA-P
CD4+ EGFP+: 70.2%
MF: 863



ICD3/iCD28
CD4+ EGFP+: 95.4%
MF: 5346

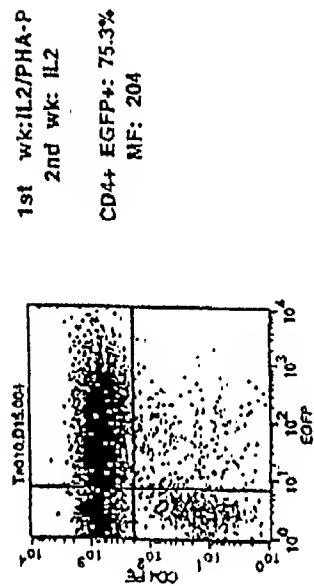
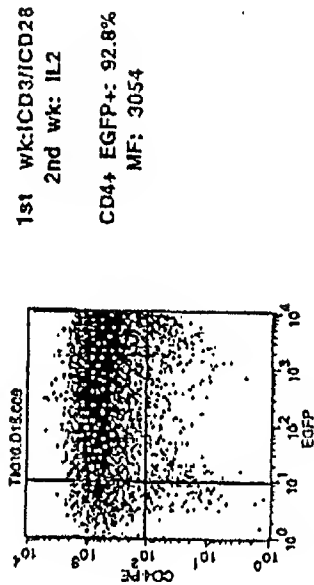


Figure 5

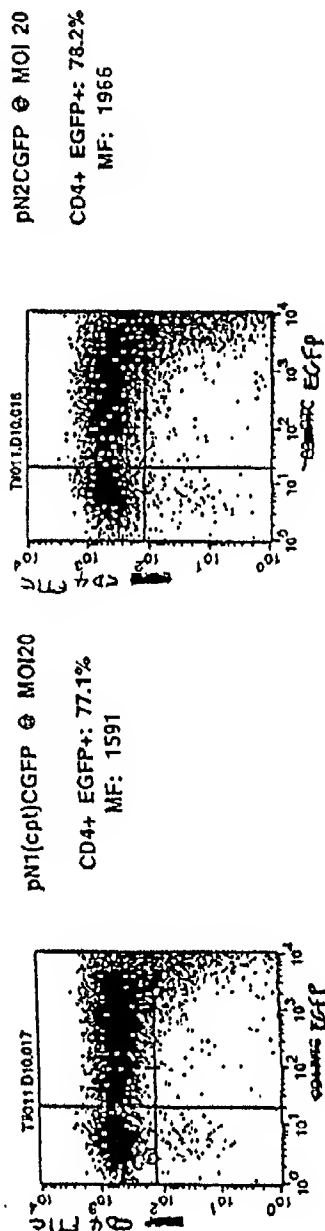


Figure 6

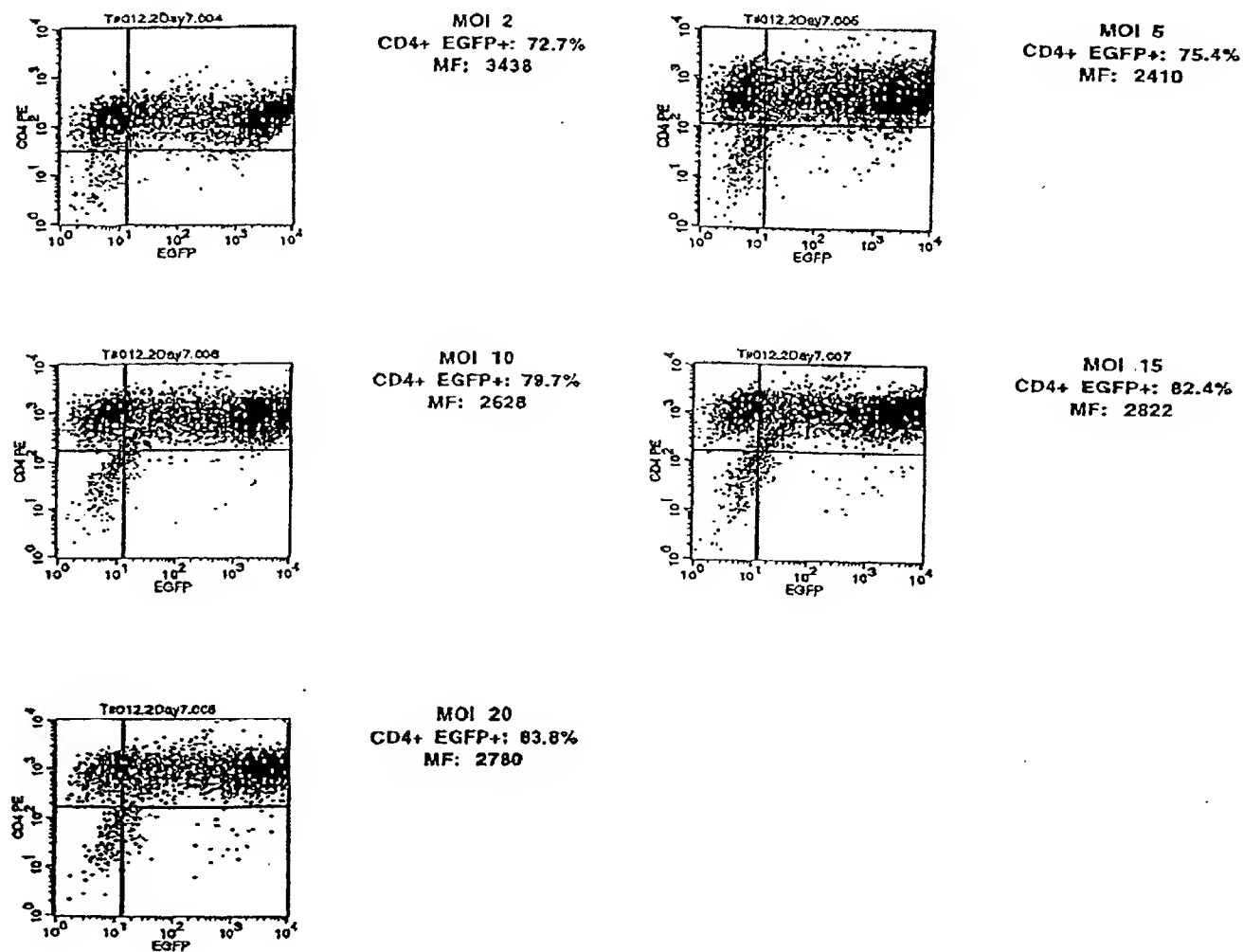
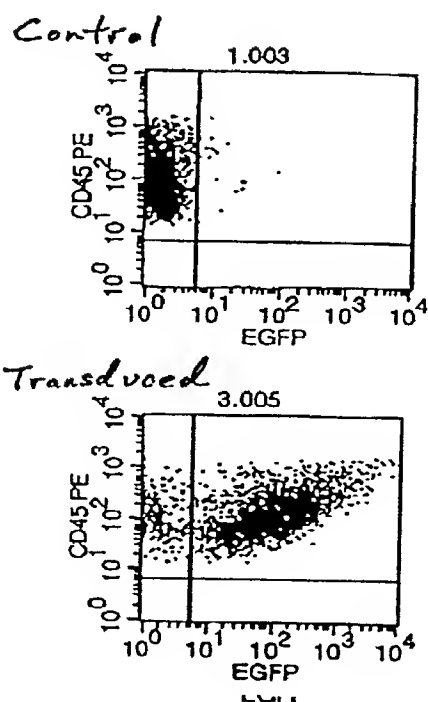
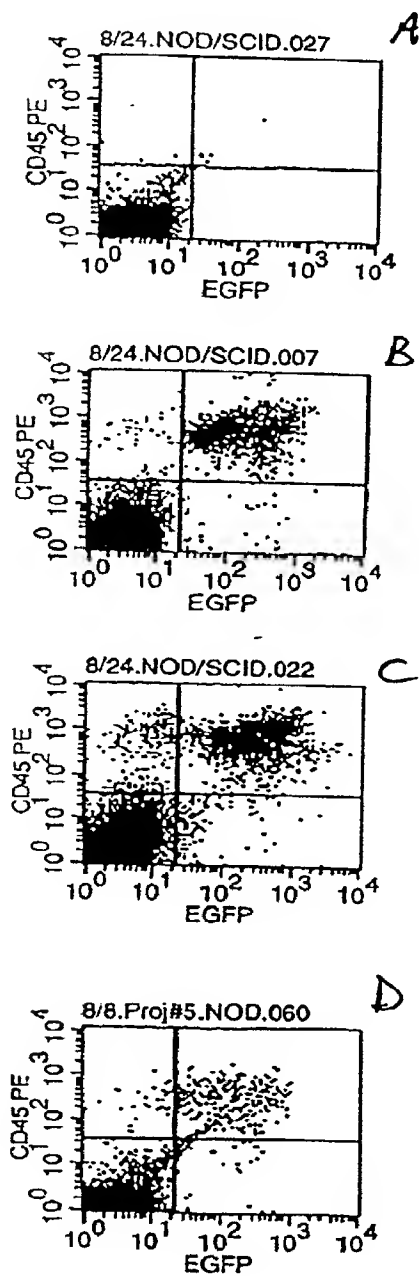


Figure 7

Figure 8



**Figure 9**

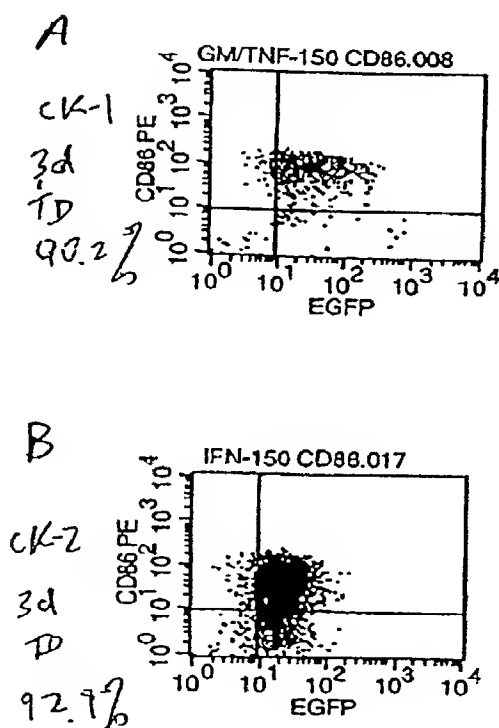


Figure 10

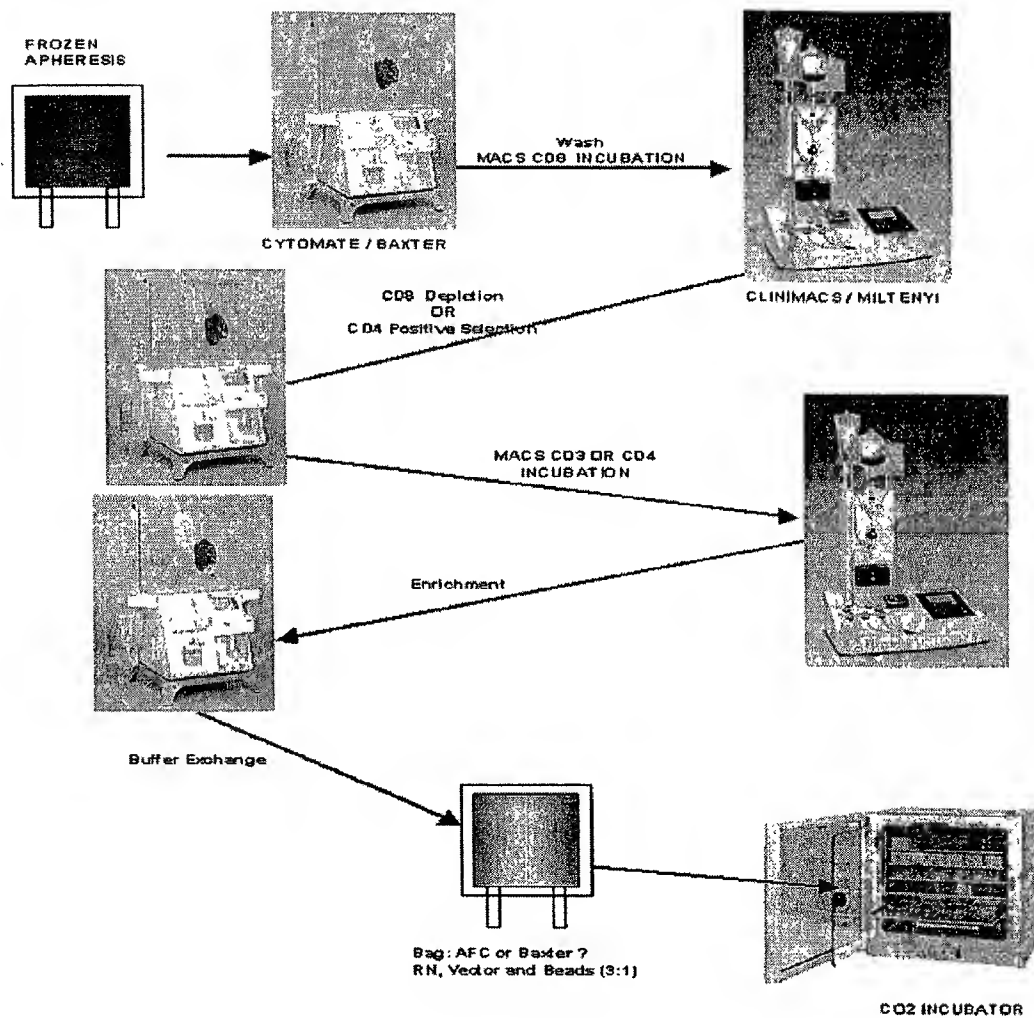


Figure 11

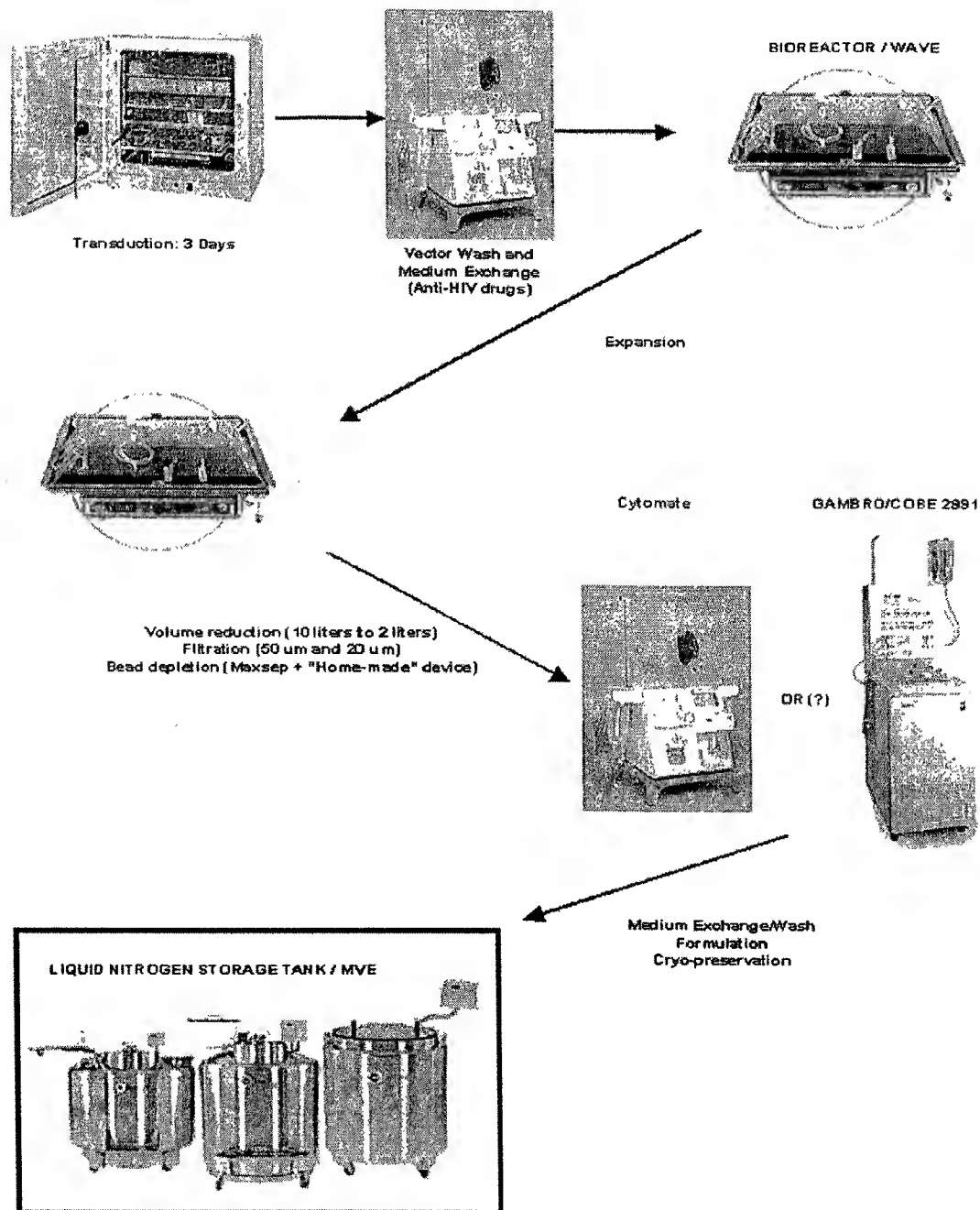


Figure 12

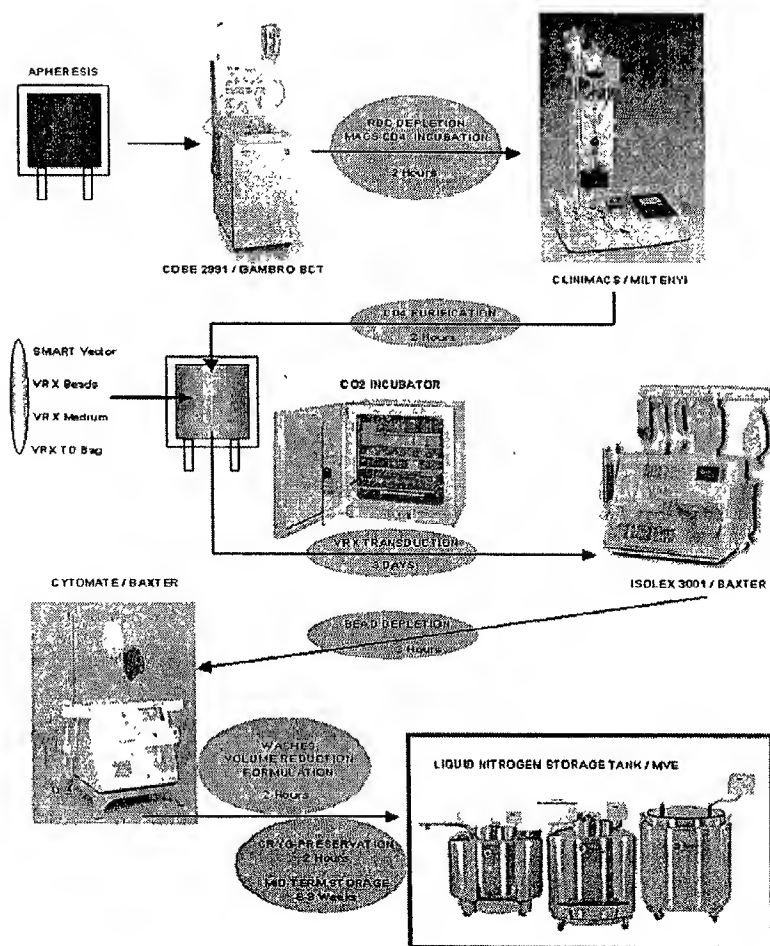


Figure 13

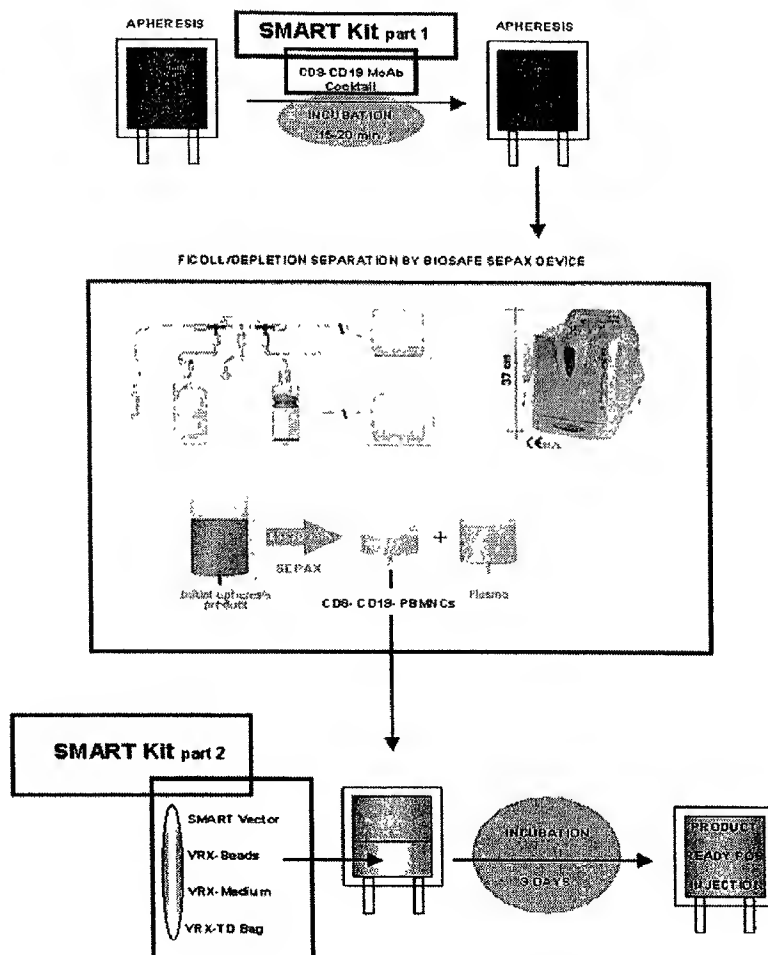


Figure 14

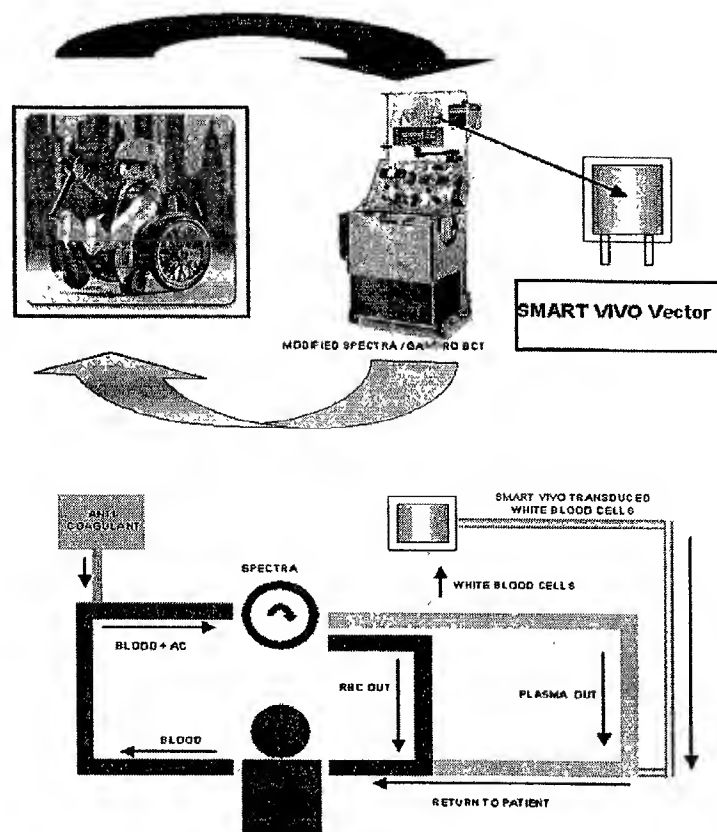


Figure 15

PCT/US06/19709

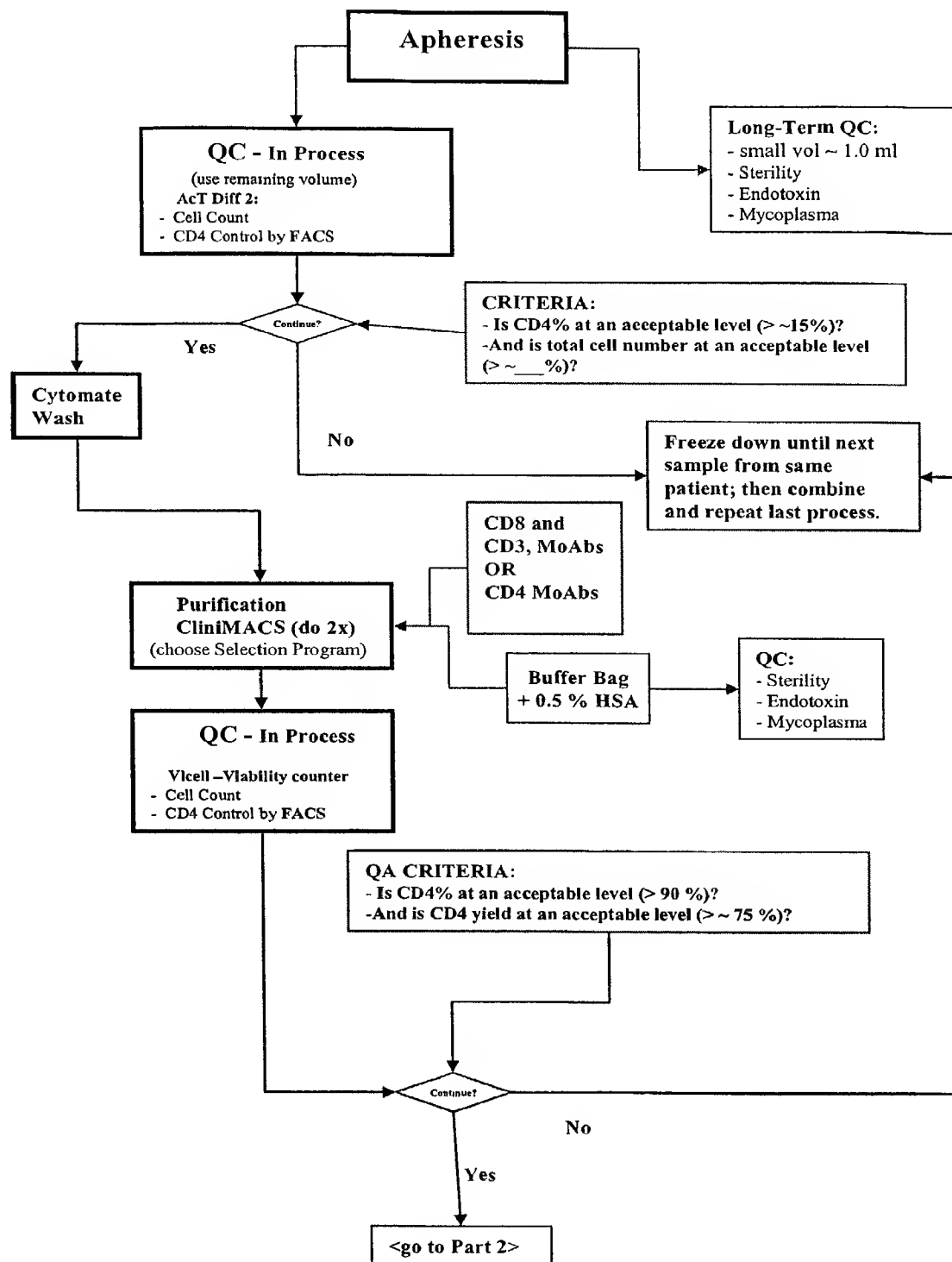


Figure 16A

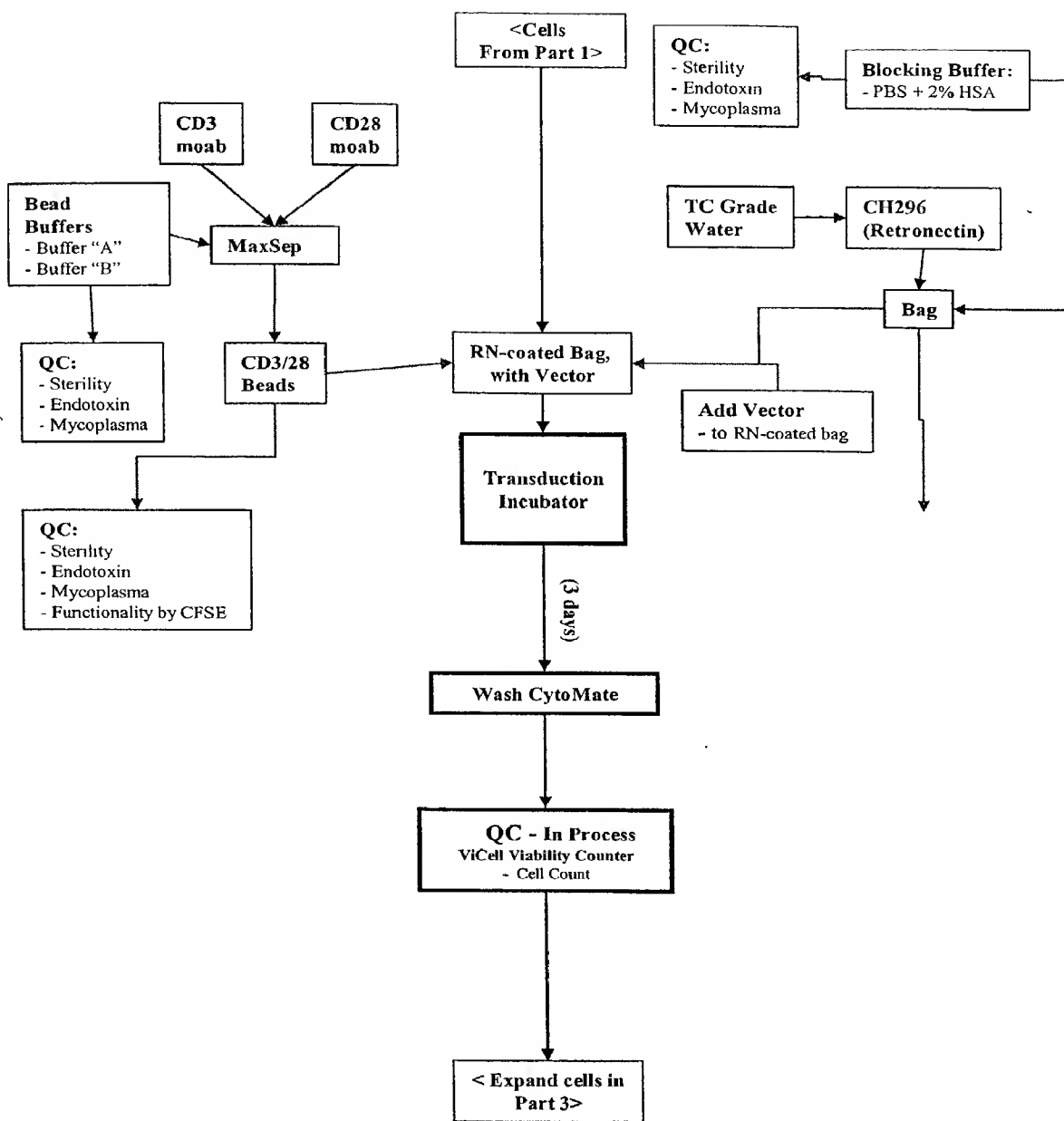


Figure 16B

PCT/US06/19709

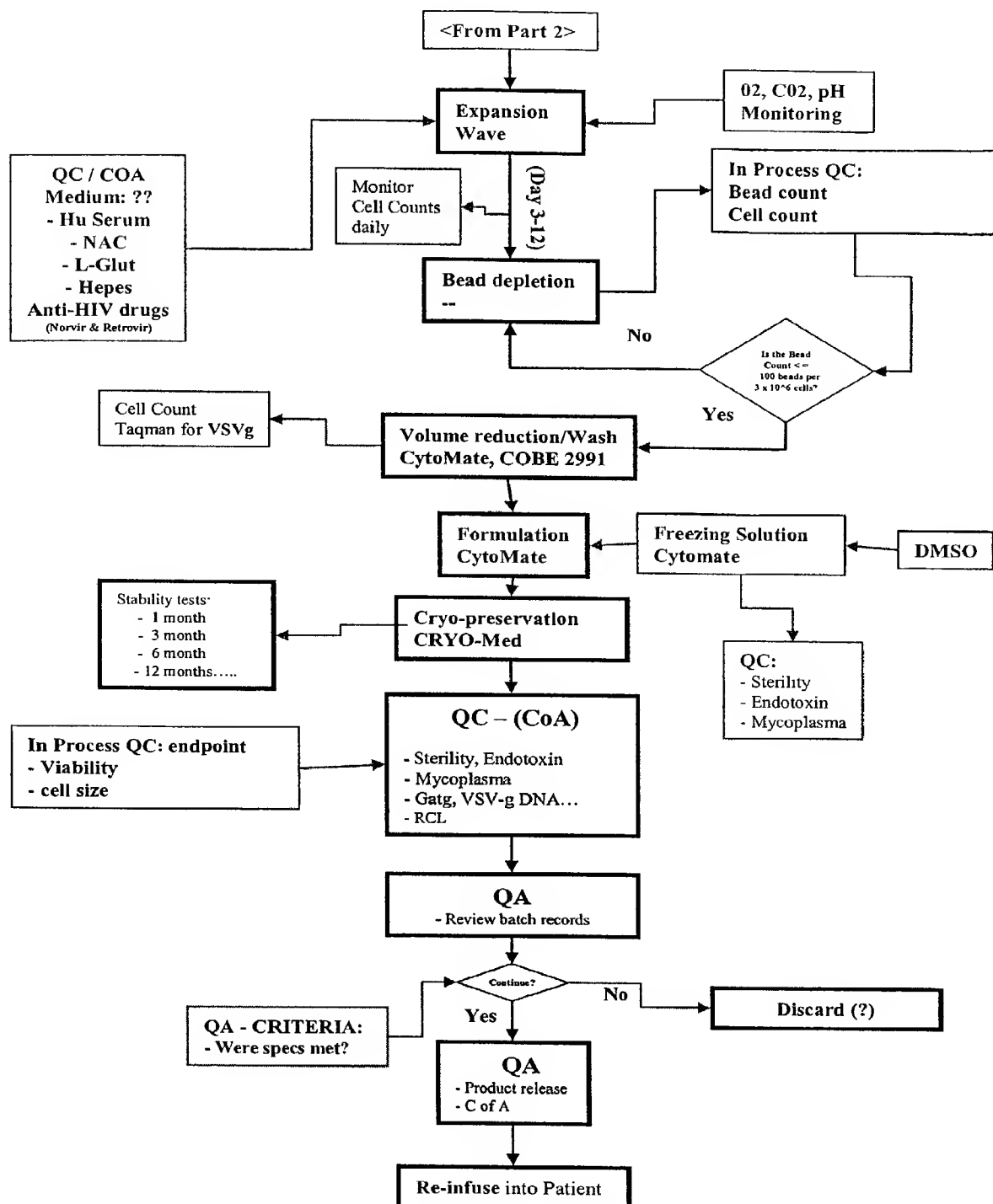


Figure 16C

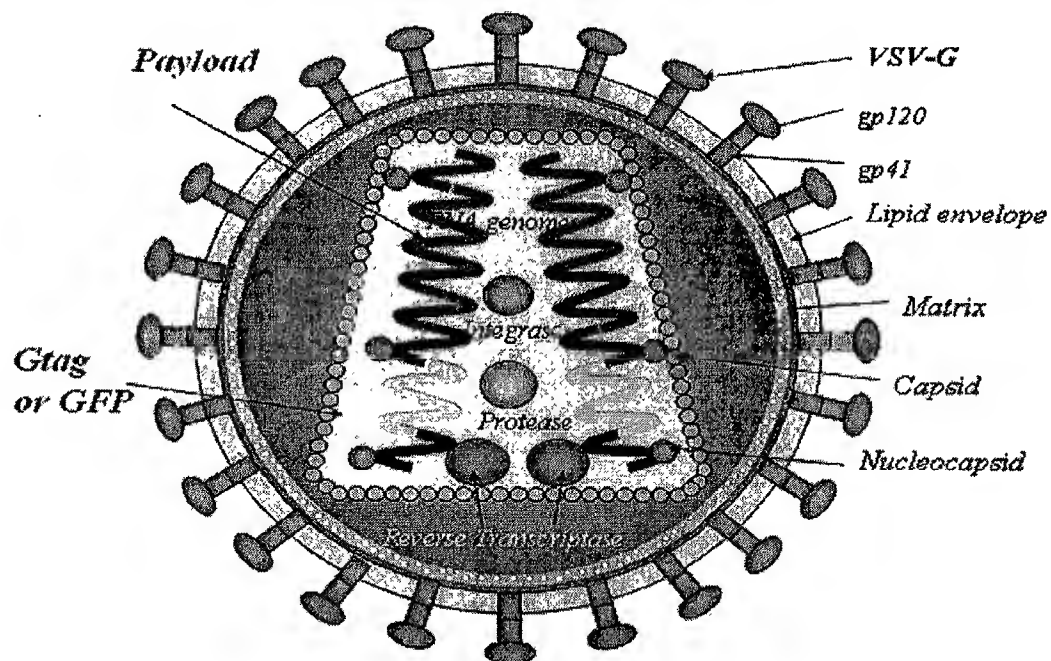


Figure 17

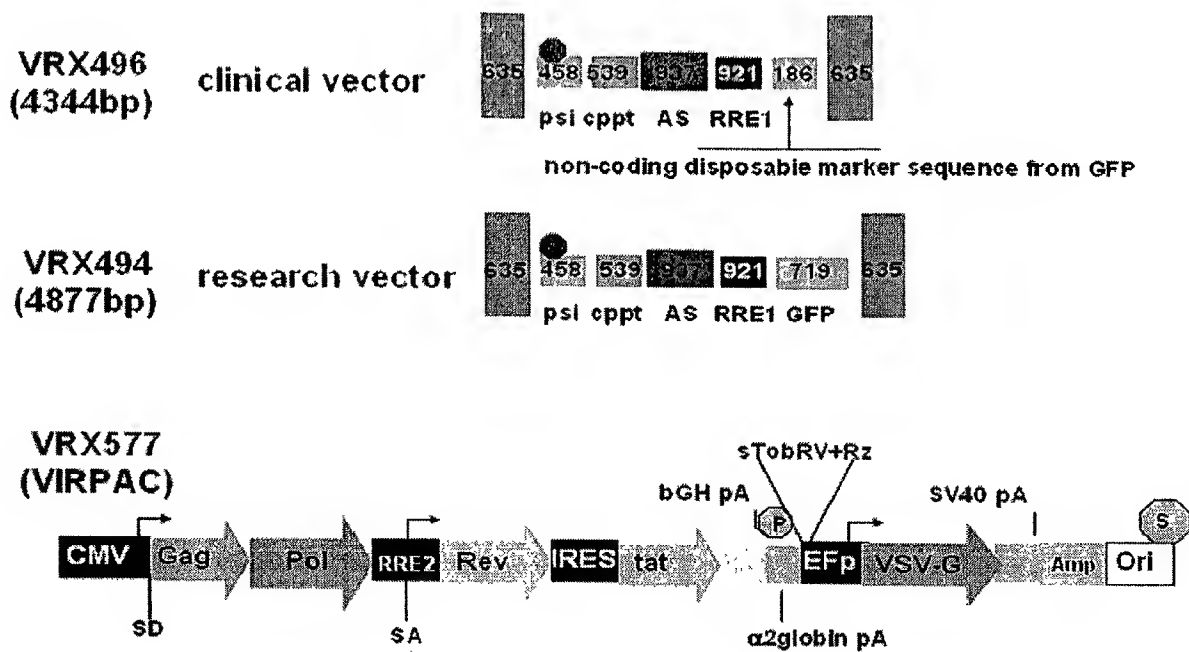


Figure 18

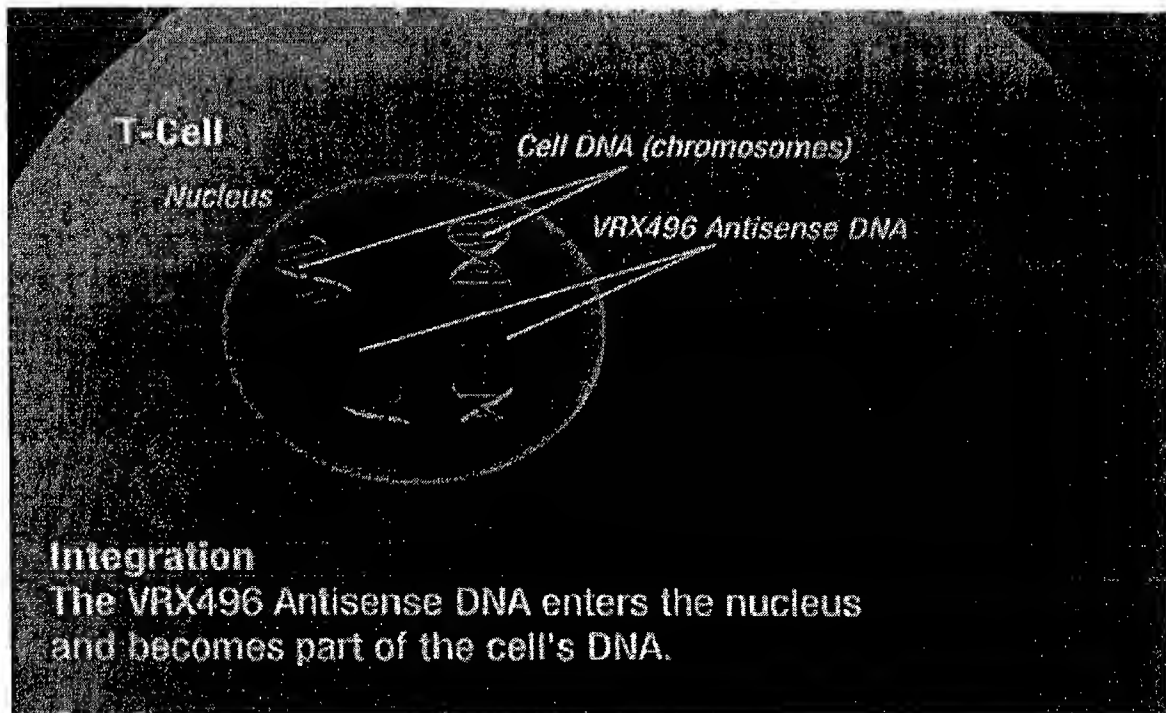


Figure 19

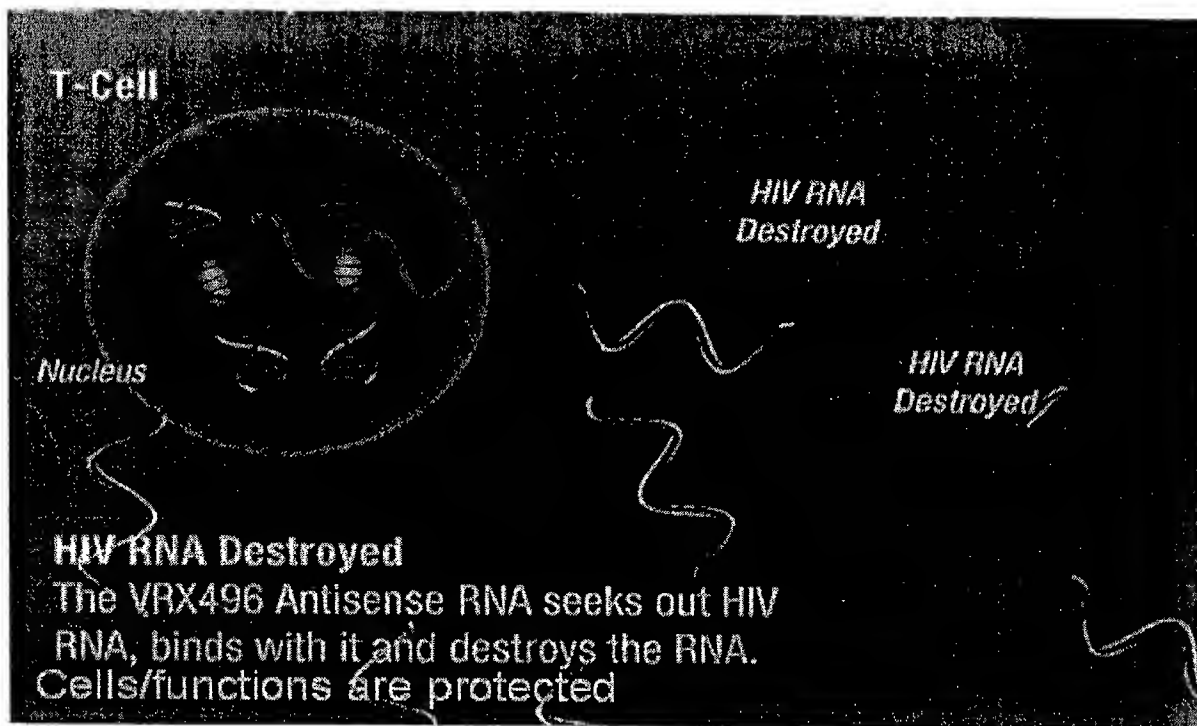


Figure 20

- **Anti HIV drugs**
 - 2-8 binding sites



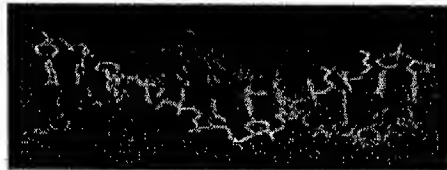
**Number of
Mutations
Needed for
Resistance**

Small

**Ability to Cause
Disease**

High

- **Long antisense RNA**
 - 937 binding sites

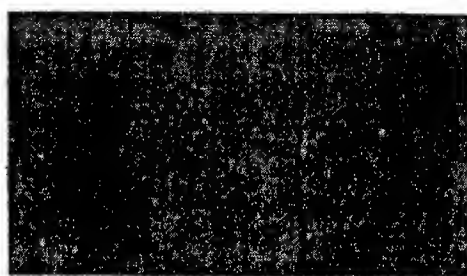


Large

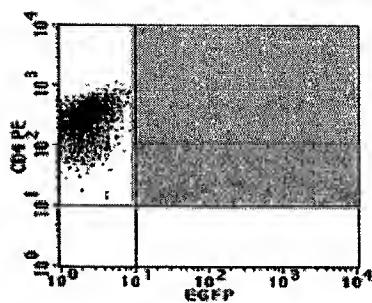
Low

**HIV either gets destroyed by antisense or it mutates to levels where the virus
is not fit to cause disease**

Figure 21

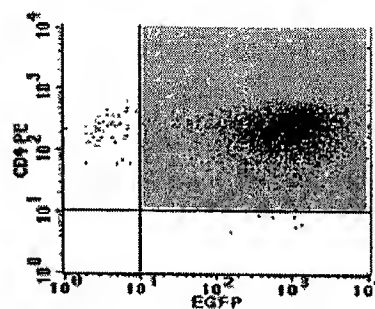


Fluorescent Microscopic
View of GFP-expressing
vector (Humeau et al.
Mol Ther, 2004)



Control

0%



+ vector-EGFP

>99%

Figure 22

PCT/US06/19709

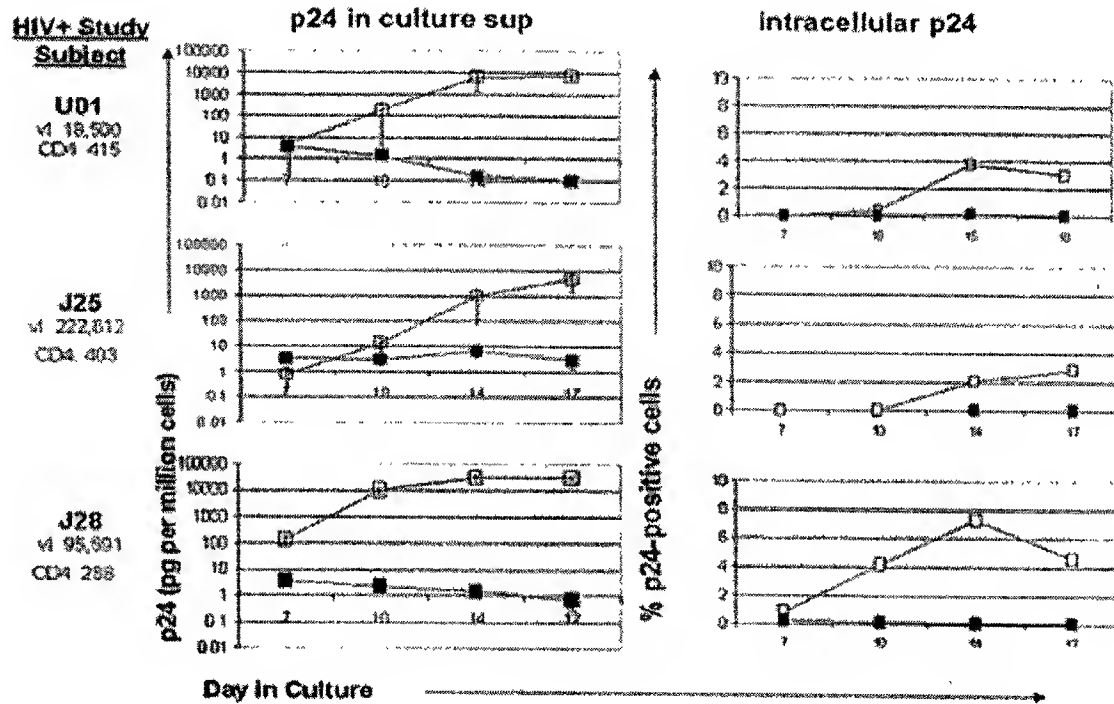


Figure 23

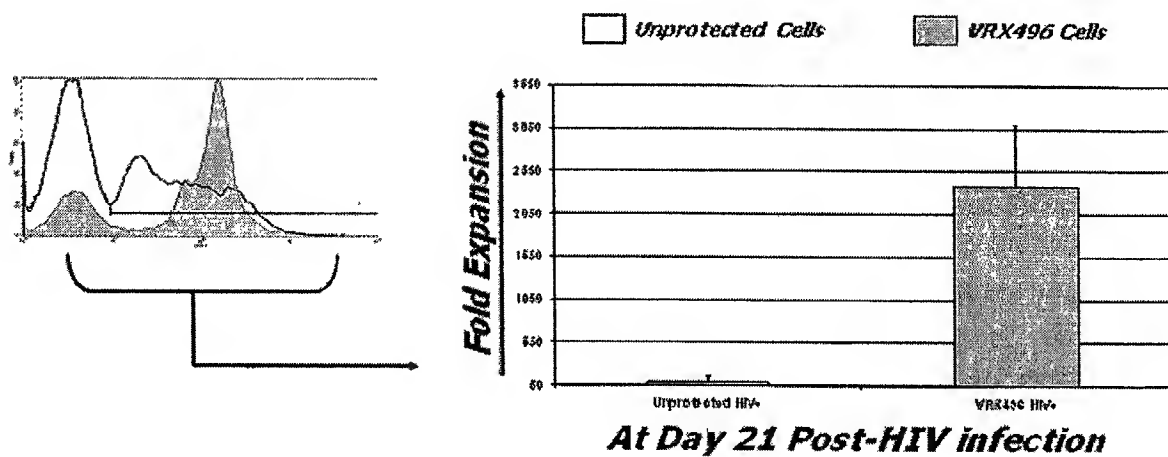


Figure 24

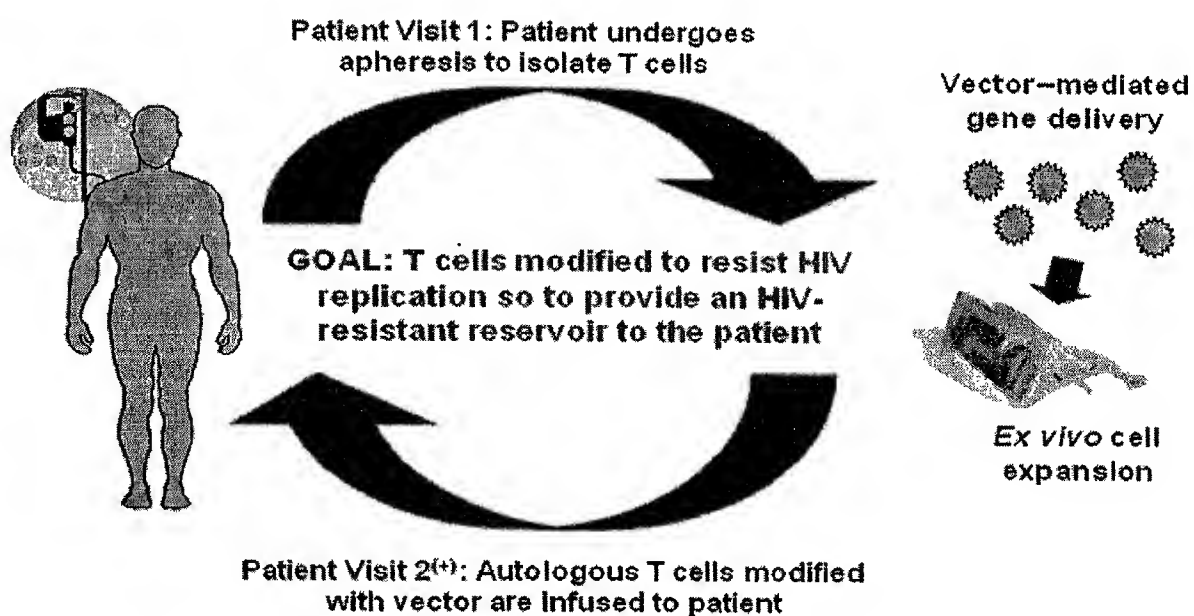


Figure 25

Table 1. Baseline characteristics of HIV subjects

Characteristics	#1 RB	#2 JFJ	#3 RAG	#4 AJ	#5 JF
Age	41	44	40	27	45
Gender	M	M	M	M	M
Ethnic Group	Caucasian	Caucasian	African American	African American	Caucasian
Mean viral load	188,500	54,100	46,150	54,213	19,972
Mean CD4 counts	228	316	241	308	220
HIV Infection (Yrs)	15	15	15	10	9
Discontinued Therapy	6 NRTI + 2 NNRTI + 5 PI	5 NRTI + 4 PI	6 NRTI + 1 PI	4 NRTI + 2 NNRTI + 1 PI	4 NRTI + 1 NNRTI + 1 PI
Current Therapy	2 NRTI + 2 PI	3 NRTI + 1 NNRTI + 1 PI	None	2 NRTI + 1 NRTI	2 NRTI + 1 PI

Figure 26

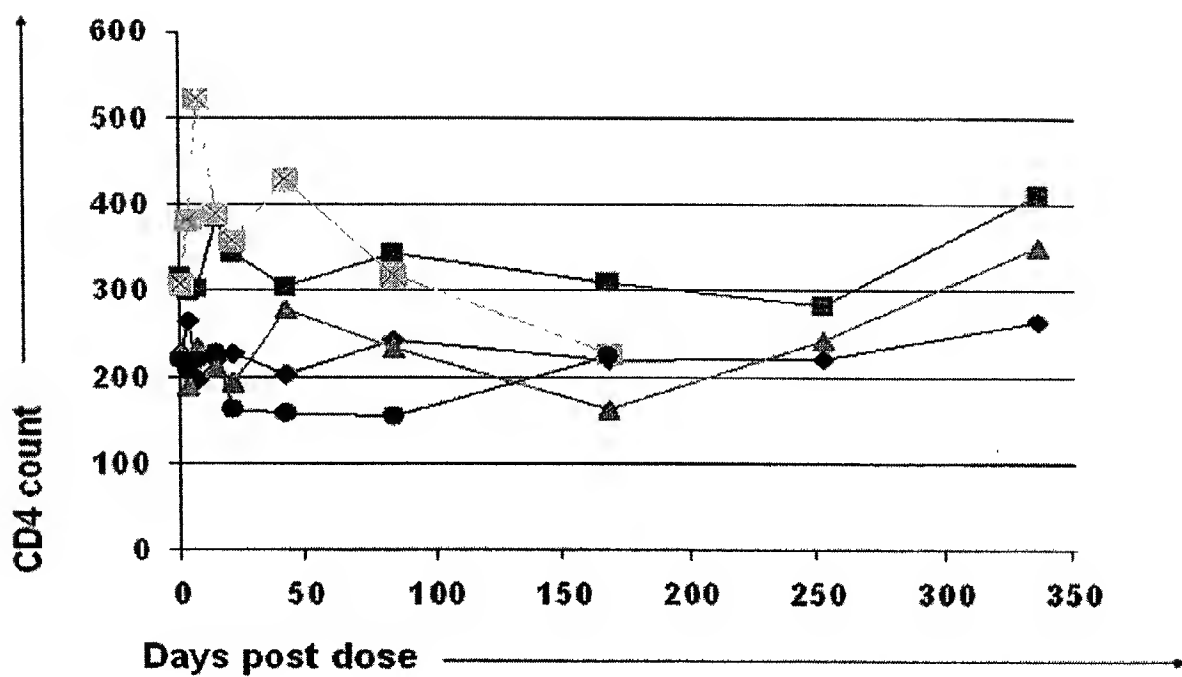


Figure 27

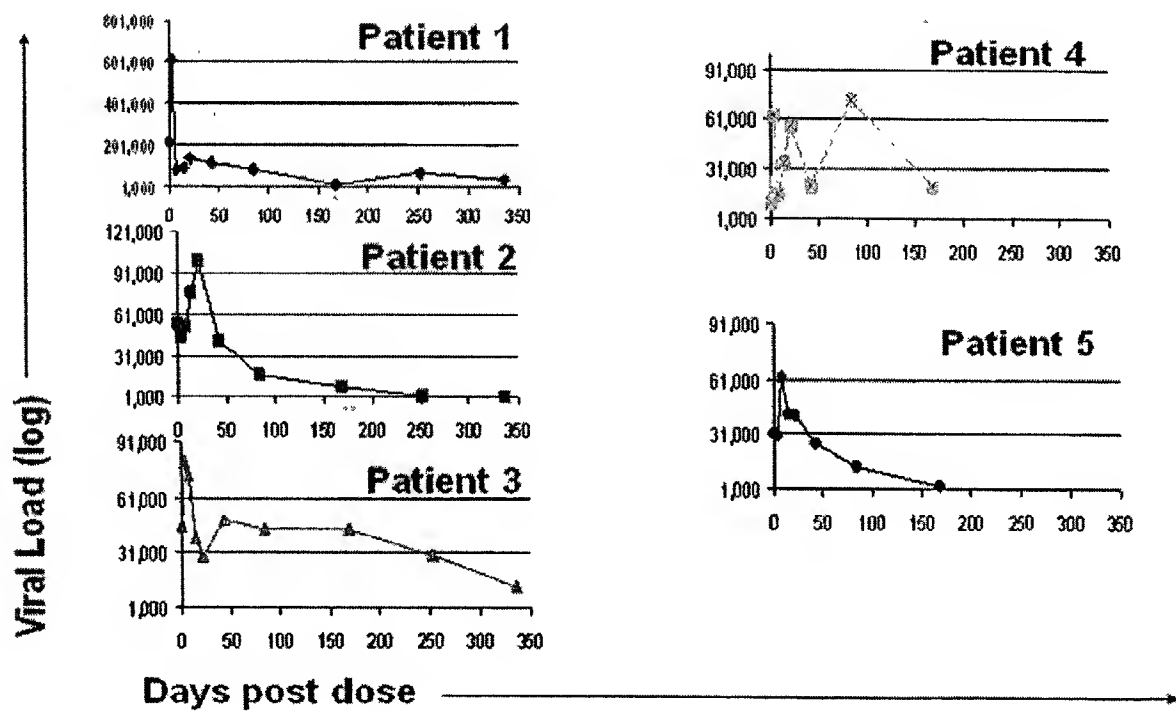


Figure 28

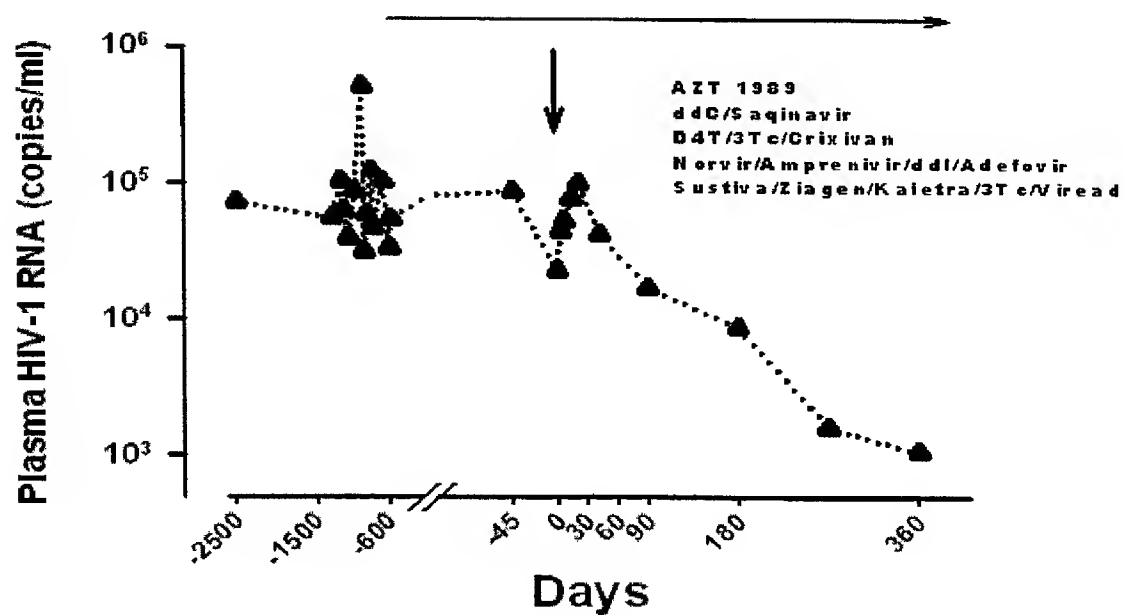


Figure 29

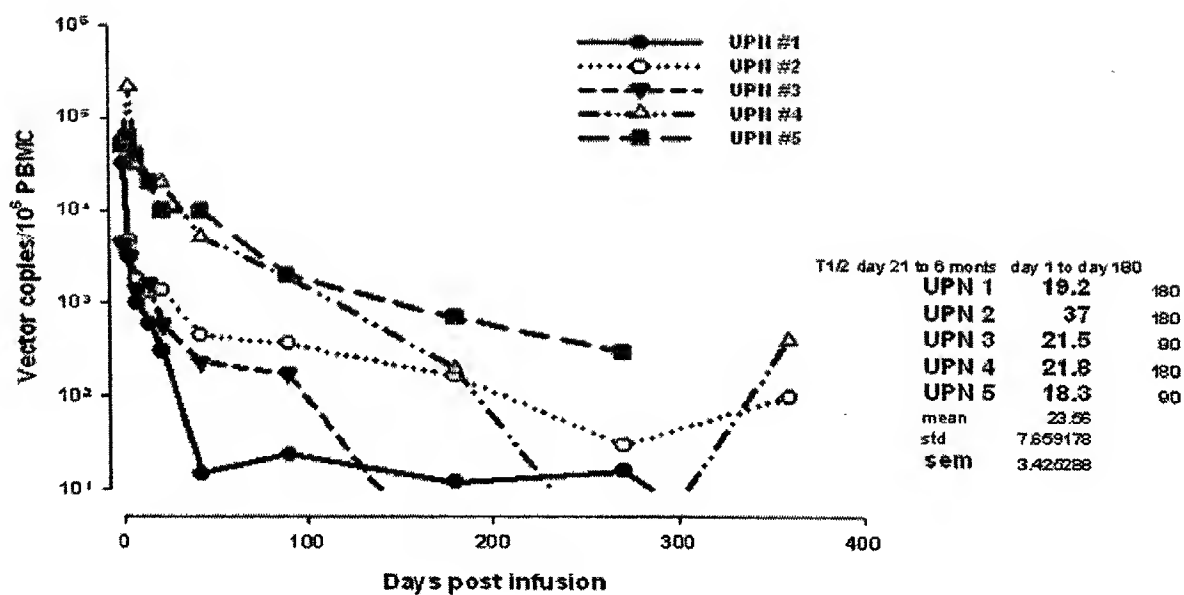


Figure 30

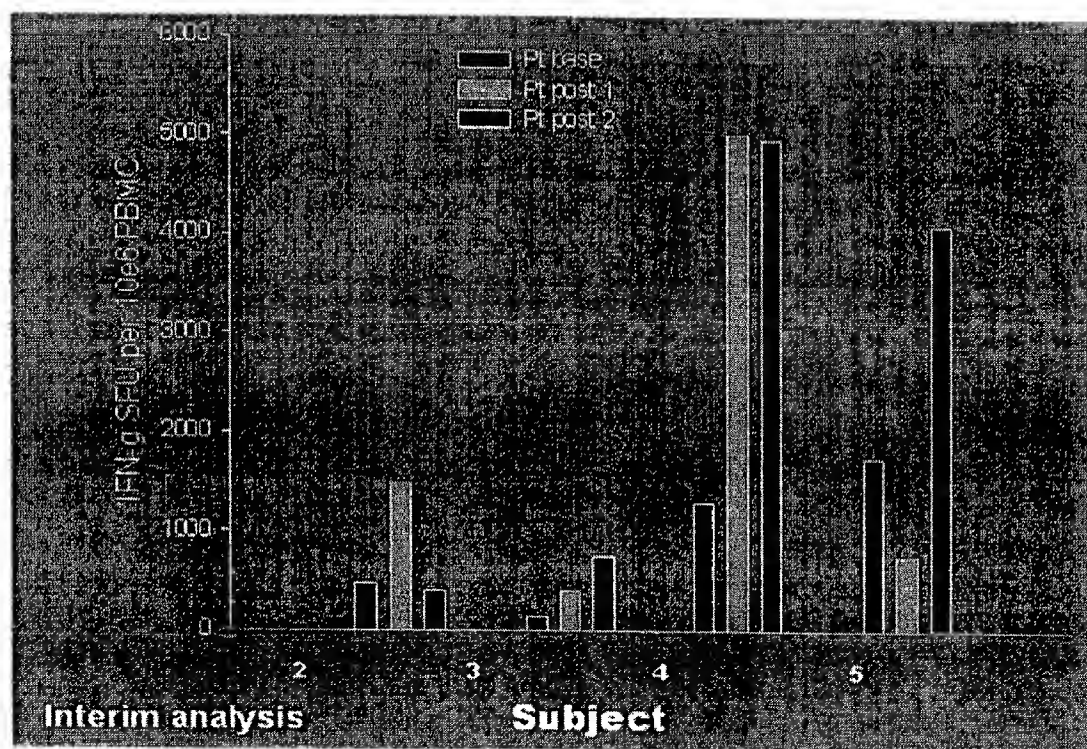


Figure 31

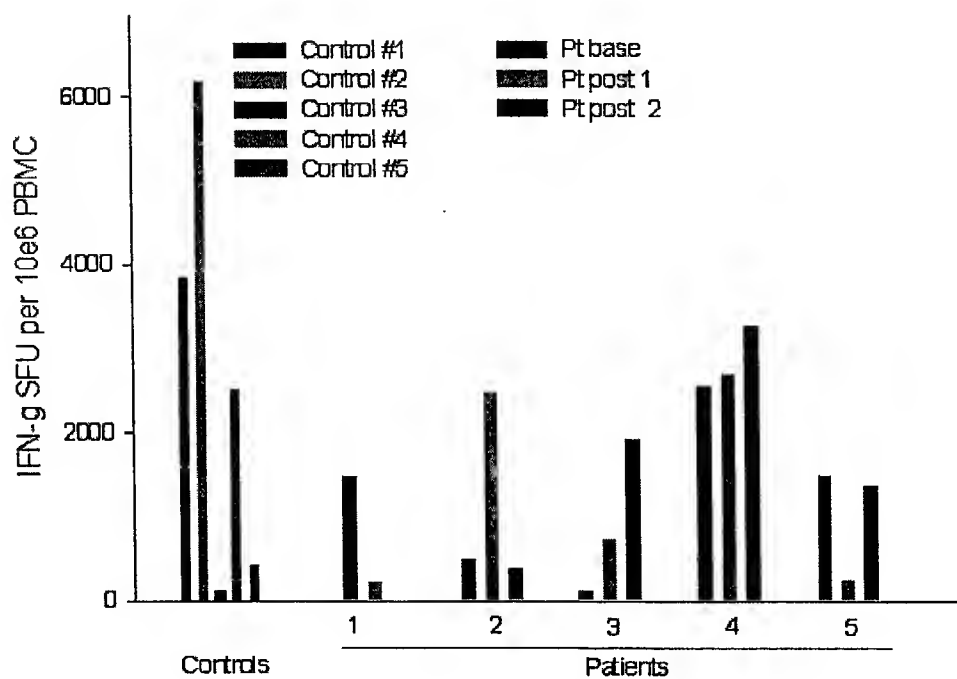


Figure 32

Parameter	Phase I Production	Phase II Production
Media	with 10% FBS	with 5% FBS
Transfection	individual cell factory per bag	8 cell factories per bag
Nunc Cell Factories	16	32
Harvest Collections	2	3
Harvest Volume	~35 L	~ 105L
Collections Mode	Individual NCF	8 NCF per bag
Clarification Filters	2 ft ²	5 ft ²
Concentration	~40 fold	~ 100 fold
Chromatography	4 separate 1L columns	2 serially connected 5L columns
Final volume	~1.2 L	~ 2.5 L

Figure 33

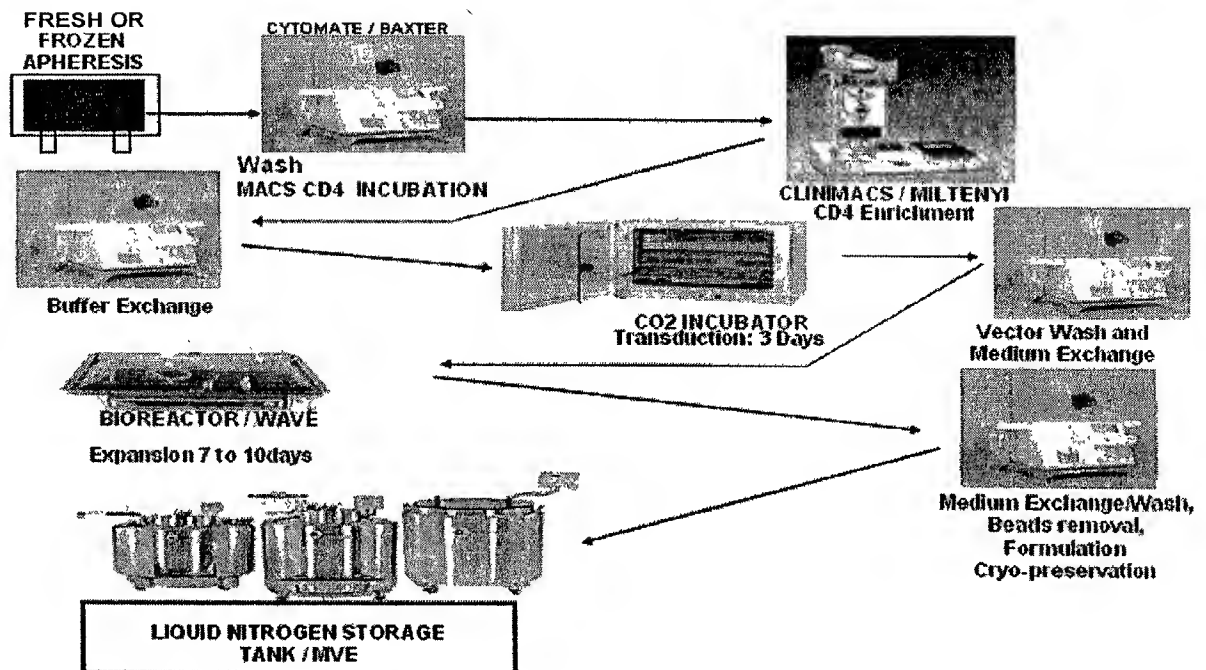


Figure 34

UPenn Phase 1 Cell Product	VIRxSYS Phase 2 Development Lots
CD4+ Cells: 56%, Abs. 3.06×10^8 (52 % recovery)	CD4+ purity: 97.62%, Abs. 3.42×10^9 (47.7% recovery)
CD4+ Cells: 52.2%, Abs. 4.38×10^8 (48% recovery)	CD4+ purity: 97.4%, Abs. 1.48×10^9 (40.5% recovery)
CD4+ Cells: 23%, Abs. 1.67×10^8 (26% recovery)	CD4+ purity: 91.77%, Abs. 2.05×10^9 (48.8% recovery)
CD4+ Cells: 33.4%, Abs. 2.93×10^8 (30% recovery)	
CD4+ Cells: 19.5 %, Abs. 1.77×10^8 (23% recovery)	
Average CD4+purity: 36.82% (range 19.5-56%)	Average CD4+ purity: 95.6% (recovery 91.77-97.62%)

Figure 35

Phase I Cell Product		Phase II Development Lots	
Subject Study ID	Vector copy number per cell	Process Run #	Vector copy number per cell
001-022 J-K	1.20	1	2.80
001-017 A-J	4.10	2	1.19
001-010 RAG	0.98	3	1.48
001-001 JFJ	1.80		
001-002 R-B	2.3		
Average	2.08		1.82

Figure 36

Phase I Cell Product		Phase II Development Lots	
Subject Study ID	Total Cells / Fold Expansion	Process Run #	Total Cells / Fold Expansion
001-022 J-K	15.8x10 ⁹ / 65	1	52.3x10 ⁹ / 28.6
001-017 A-J	20.6x10 ⁹ / 40	2	104x10 ⁹ / 58.8
001-010 RAG	6.8x10 ⁹ / 25	3	96.6x10 ⁹ / 63
001-001 JF1	11.5x10 ⁹ / 32	4	87.5x10 ⁹ / 63.2
001-002 R-B	15.2x10 ⁹ / 66		
Average	14x10⁹ / 45.6		85.1x10⁹ / 53.4

Figure 37